Area Planning Process

ComEd Process
AM-CE-P127
Revision No.: 4

Effective:	11/23/2020
Supersedes:	N/A
Level:	3
Review Type:	3 Year
Core Function:	Capacity Expansion

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1. Purpose

1.1. The purpose of this process is to define the ComEd Distribution Capacity Planning Process, utilizing the Area Planning Concept to ensure that every component on the distribution system meets the ComEd Distribution Capacity Planning Guidelines.

1.2. This process is part of the implementation of the Company's response to the ICC Liberty Audit Recommendation 5-5 (project triggers), 9-1 (review loads with OCC), 11-8 (maintain adequacy of substation transformer loading), and 15-1 (ensure adequate plans are issued to maintain integrity of the system).

1.3. A revision to this process shall not be made that would change the Company performance on the actions committed to in response to the ICC Liberty Audit Recommendation 5-5, 9-1, 11-8, and 15-1 without the approval of the program commitment owner vice-president.

2. Precautions and limitations

2.1. Precautions

2.1.1 N/A.

2.2. Limitations

2.2.1 N/A.

3. Process

3.1. Summary

3.1.1 N/A.

3.2. Process Flow Diagram

3.2.1 See Attachment AM-CE-P127-2 for process flow chart.

3.3. Process Listing (List Key Process Elements)

#	Process Element	Description	Performed By
N/A	N/A	N/A	N/A

3.4. Assumptions

3.4.1 N/A

3.5. INITIATE VALIDATION PLAN

3.5.1 APT Administrator enters the selected peak load days into the Area Planning Tool (APT) for the Validation Plan. APT automatically imports load and weather for the selected peak days. If SCADA data is not available, the Planner enters data from manual readings into APT.

3.5.2 See Process Flowchart Attachment AM-CE-P127-2 for process flow.

3.5.3 NOTE: The Official Plan is locked when last Area Plan has been challenged internally and the Validation Plan is opened. This typically occurs in late May.

3.6. WEATHER ADJUST LOAD DATA

3.6.1 Actual SCADA measured and manually entered loads are automatically weather adjusted within APT (Area Planning Tool) using AM-EU-09145, Distribution Capacity Planning Weather Adjustment Process. These weather adjusted (WA) values are used as the base load for future year load forecasts. The base load is the starting point of all forecast years.

3.7. VALIDATE AND CHOOSE WA LOAD DATA (VALIDATION PLAN)

3.7.1 The Capacity Planner checks the data pulled in from SCADA, and makes adjustments for out of configuration issues. This is known as the validation process. The Planner will analyze customer generation, load curtailments, capacitors out-of-service, automatic throw-over (ATO) switches, out of normal configuration switching, validating customer load ramp ups, etc.

3.7.2 See Attachment AM-CE-P127-1 for process of choosing loads.

3.8. INITIATE OFFICIAL AREA PLAN

3.8.1 APT Administrator verifies that all first year forecasts are within the ComEd Distribution Capacity Planning Guidelines.

3.8.2 APT Administrator initiates creation of a new Official plan and specifies the plan title, type, date range, and parent plan using the APT application. The APT application copies the selected peak load days from the Validation Plan into the Official Plan during this process.

3.8.3 NOTE**:** The Validation plan is locked and the Official Plan is now opened. This typically occurs in October.

3.9. CHECK THE SYSTEM CONFIGURATION CONNECTIVITY

3.9.1 After customer specific new business load values are added, the Planner ensures these values are rolling up to the proper substations. Unidentified load growth will be determined by the INSITE forecast analysis.

3.9.2 If there is a problem with the connectivity, the Planner corrects it in APT. Refer to the APT User's Manual for process of developing and validating the connectivity model. The Planner uses the Connectivity Validation Report in the APT Substation Connectivity module to verify that the business rules for connectivity have not been violated.

3.10. FORECAST AND CHALLENGE LOAD GROWTH AND NEW BUSINESS

For additional details, see AM-CE-3032 for the Short-Range Load Forecasting Procedure.

3.10.1 Planners make additions to the previous year's forecast by adding recently identified (after the Validation Plan is locked down) specific customer New Business loads. The unidentified load growth field in APT is not to be used to represent identified load additions. The unidentified growth field is populated after the load growth challenge is completed.

3.10.2 Forecast Coordinator runs INSITE to produce a total load forecast, including estimated unidentified growth, for feeders and substations.

3.10.3 During periods of business recession, the Planner has the discretion to utilize a Business Recovery Adjustment. For feeders and substations where the WA load has decreased from the previous year's WA actual, the Planner can consider selecting the previous year's actual peak load and date.

3.10.4 Capacity Planning Managers conduct Load Forecast Challenge Meetings. During the Challenge, the Planner reviews the INSITE forecast results and may present data and reasons for considering an alternate forecast. The Capacity Planning Manager approves the final forecast value.

3.10.5 The APT Administrator arranges for the loading of the results of load growth challenges into APT for planning the next year's capacity expansion projects.

3.11. IDENTIFY COMPONENTS THAT VIOLATE PLANNING GUIDELINES

3.11.1 Each component (feeder, transformer and terminal) is reviewed to determine if it is in compliance with the ComEd Distribution Capacity Planning Guidelines (AM-CE-Y013-R0002). This includes capacity, contingency (N-1), and voltage issues.

3.12. DEVELOP AND EVALUATE SOLUTIONS

3.12.1 Planners develop solutions within the area concept to address the components that violate the ComEd Distribution Capacity Planning Guidelines. Alternate solutions with cost and consequence analysis will be developed using the Project Options Review Form.

3.12.2 Planners will then evaluate the alternate solutions to determine how well they address the overload problem.

3.12.3 Typical solutions include, but are not limited to transformer additions, distribution automation, new feeders, feeder extensions, feeder switching, phase balance, and capacitor installations.

3.12.4 The Planner shall review the Substation Health Index report (Asset Performance and Investment Strategy) to determine the material condition of the components that are being relieved and the condition of components that may be part of an alternate solution. The Planner will evaluate whether a dual-purpose solution can be developed, one that meets the capacity needs and also improves a material condition concern.

3.12.5 The most effective and least cost, feasible solution over the planning horizon, that addresses feeder and substation capacity shortages in the planning area will be the preferred plan. All other solutions will be considered the alternatives. The lowest initial cost solution is preferred if alternatives have comparable long-term costs.

3.12.6 Review and apply AM-EU-09125 Project Planning Lead Time Procedure.

3.12.7 Review and apply AM-EU-09131 Load Transfer Estimate Procedure.

3.12.8 The Planner prepares conceptual capacity solution descriptions (sketch optional) that include system additions or changes and conceptual cost estimates.

3.12.9 The Planner enters the proposed modifications to the circuit connectivity and load transfers in APT for the preferred alternative solution.

3.12.10 Planners develop a Pre & Post project Risk Score for the preferred solution based on a Figure of Merit or Net Present Value. Refer to Investment Strategy Project Risk Score matrix.Planners develop a Risk Score for the preferred solution based on a Figure of Merit. Refer to Capacity Planning Project Risk Score Form job aid.

3.13. PREPARE REPORTS FOR PLANNING CHALLENGE MEETING

3.13.1 The Area Plan contains a summary of forecast substation and feeder loads before and after proposed projects.

3.13.2 The Area Plan also contains a high level description and cost estimate for major substation and feeder capacity projects for the following five years. The Planner assembles this information for the meeting.

3.13.3 The Area Plan typically includes a planning area map and a station feeder map. Documentation requirements for the Area Plan can be found in Capacity Planning Job Aid 008 Area Plan Study Requirements Checklist. In congested areas (e.g., Chicago), the maps may not be useful.

3.14. AREA PROJECT CHALLENGE MEETING

3.14.1 The Project Challenge meeting is an opportunity for the Area Planner, Regional Capacity Planning Managers, Capacity Planning Manager, staff, and other stakeholders to review the Area Plan.

3.14.2 The Regional Capacity Planning Managers and staff ensure that the ComEd Distribution Capacity Planning Guidelines were followed.

3.14.3 The Regional Capacity Planning Managers, Capacity Planning Manager, and staff also challenge the different alternatives presented in the Area Plan, establishing agreement upon the chosen solutions.

3.14.4 Regional Capacity Planning Managers ensure the components meet Planning Criteria and the documentation is complete. Also, a list of action items is recorded. See Job Aid 008 – Area Plan Study Requirements Checklist.

3.14.5 To meet project lead-time requirements for Project Diagrams with large scope, additional Project Challenge Meetings will be required outside the Official and Validation Plan Process. These meetings will provide sufficient lead-time for these Project Diagrams to be engineered and constructed.

3.15. RISK-BASED PROJECT PRIORITIZATION AND SELECTION

3.15.1 If total approved projects exceed the Capital Budget, all projects are ranked according to their risk-based figure of merit score, highest to lowest.

3.15.2 Projects with a high figure of merit are funded first; those with the lowest values are funded only if available budgets permit. No additional work is done on projects with low rank, which are unlikely to be funded.

3.16. PLANNING EXCEPTION FORM

3.16.1 In very limited cases, the Director of Director of Planning and Smart Grid will approve an exception to the ComEd Distribution Capacity Planning Guidelines (AM-CE-Y013-R0002).

3.16.2 Complete the necessary form in Attachment AM-CE-P127-3.

3.17. DRAW PROJECT DIAGRAM

3.17.1 The Planner will develop the Project Diagram to outline the solution.

3.17.2 Prepare the PD in accordance with AM-EU-09139, Project Issuance Procedure for Capacity Planning. New feeders and substations are identified in accordance with Procedure AM-CE-9130, Identification of Substations, Circuits, and Electrical Equipment.

3.17.3 For Project Diagrams greater than $1,000,000, planner will request a cost estimate from the Project Management Organization before Phase 1 Approval. See AM-ED-P002, Project Approval Process for Capacity Planning

3.18. INCORPORATE COMMENTS INTO AREA PLAN

3.18.1 The Planner makes any necessary revisions to the Area Plan documentation, which is identified in the Project Challenge Meeting.

3.19. POST AREA PLAN

3.19.1 After the required action items are completed and the Regional Capacity Manager approves the Area Plan, the Planner posts required Area Plan documentation on the Capacity Planning website.

3.19.2 APT Administrator sends the TSS/TDC load forecast to Transmission Planning/Reinforcement.

3.19.3 As requested by the Supply Organization, the Planner creates a list of long lead material for distribution projects.

3.20. FINAL AREA PLAN DATA REVIEW

3.20.1 After all the Area Plans are completed, the APT Administrator runs reports to ensure that no component's loading is above applicable limits. Additional reports are run to ensure all the proposed transfers have associated Project Diagrams and the Project Diagrams have been issued. A company wide Connectivity Validation Report is run to ensure all connectivity business rules have been followed.

3.21. REVIEW AREA PLANS AND FORECASTED LOADS WITH OCC

3.21.1 The Area Plan work and Planning Exceptions are reviewed with the OCC by March 31 each year.

3.22. PROJECT APPROVAL

3.22.1 Projects included in the Areas Plans are submitted for approval in accordance with the Project Approval Process for Capacity Planning, AM-EU-09129.

3.23. CAPACITY PLANNING MATERIAL CONDITION REVIEW

3.23.1 After the close of the Area Plan, Capacity Planning will meet with Asset Performance and Investment Strategy to identify substation or line assets that are judged to be a high priority from a material condition perspective.

3.23.2 For the higher priority items, Capacity Planning will determine how these assets fit into the long-range plan of the system. Rather than a straight asset replacement approach, Capacity Planning will evaluate whether a lower cost alternative exists when combined with capacity issues in the Area Plan.

3.23.3 The determination of which Work Category funds the alternative will be determined on an individual case basis.

3.24. WINTER RELIEF PROJECT DIAGRAMS

3.24.1 The APT Administrator selects appropriate winter peak load days in the Official Plan in accordance with AM-EU-09145 Distribution Capacity Planning Weather Adjustment Process.

3.24.2 For winter peaking components, the Planner reviews the impacted components and develops a solution for these components that will not meet ComEd Distribution Capacity Planning Guidelines (AM-CE-Y013-R0002) by the end of May.

4. Roles and responsibilities

4.1. APT ADMINISTRATOR

4.1.1 Supports the APT application in Capacity Planning. Coordinates and prioritizes enhancements to the APT application.

4.1.2 Coordinates the locking and opening Official Plan and Validation Plan. Verifies that target year overloads and connectivity validation errors have been addressed before closing a Plan.

4.1.3 Enters the selected summer and winter peak load days into the Area Planning Tool (APT) for the Validation Plan along with the minimum and maximum temperatures. Typically, only winter peak dates are entered into the Official Plan.

4.1.4 Authorizes Planners for access to the APT application. Non-Capacity Planning users can be authorized with “read-only” permissions for APT.

4.1.5 Coordinate the update of forecast data in APT after the Load Challenge Review.

4.1.6 Begins to prepare for the lockdown of APT one month before the designated date. This includes reviewing test scripts and data validation.

4.2. CAPACITY PLANNER (PLANNER)

4.2.1 Ensures all components are in compliance with ComEd Distribution Capacity Planning Guidelines AM-CE-Y013-R0002.

4.2.2 Identifies issues and prepares proposed solutions and alternatives for capacity problems for review by the Capacity Planning Manager and the Regional Capacity Managers per the ComEd Distribution Capacity Planning Guidelines.

4.2.3 Responsible for the overall configuration of the distribution system, including both long term and short term changes in response to new business and unidentified load growth.

4.2.4 Responsible for distribution substation capacity, distribution circuit loading, primary circuit voltage adequacy and phase balance.

4.3. CAPACITY PLANNING MANAGER

4.3.1 Is the Owner of the Capacity Planning process.

4.3.2 Approves the exceptions to the ComEd Distribution Capacity Planning Guidelines, AM-CE-Y013-R0002.

4.3.3 Reviews and recommends future major Capacity Issues/Projects and Programs.

4.3.4 Is the Capacity Expansion Category Owner.

4.4. REGIONAL CAPACITY PLANNING MANAGER

4.4.1 Reviews and recommends both long term and short term Capacity Issues/Projects to be included in the Capacity Expansion Category.

4.4.2 Reviews and recommends future major Capacity Issues/Projects for evaluation by the Capacity Planning Manager.

4.4.3 Reviews capacity area plans prior to internal review.

4.4.4 Responsible for completing the Area Plan Study Requirements: Manager Review Checklist per Job Aid 008 – Area Plan Study Requirements Checklist.

4.5. DIRECTOR OF PLANNING AND SMART GRID

4.5.1 In very limited cases, the Director of Engineering will approve an exception to the ComEd Distribution Capacity Planning Guidelines.

4.6. FORECAST COORDINATOR

4.6.1 Responsible for operation of INSITE tool to support the load forecast process.

4.7. TRANSMISSION PLANNING/REINFORCEMENT

4.7.1 Transmission Planning/Reinforcement is the department within the Transmission Strategy organization responsible for the overall planning of the transmission system. Transmission Planning/Reinforcement is responsible for reviewing the impact of major substation additions or expansions on the transmission system. They are the design authority for determining the configuration of and the rating requirements for the transmission system.

5. Documentation

5.1. Documentation generated during performance of this document shall be filed in accordance with Exelon Corporate Procedure LE-AC-401, Records and Information Management, Retention and Disposition.

6. Terms and definitions

6.1. ALLOWABLE LOADING (RATING) – Maximum permitted equipment loading during normal configuration, sufficient to meet the range of normal and emergency peak demands likely in a worst case hot weather (one-in-ten year) scenario on main stem circuits, substations, and radial transmission lines. This rating represents the maximum loading during normal configuration that will not exceed load to trip limits, applicable emergency ratings, or voltage limits considering the effect of automated load transfers and planned outages of applicable distributed generation.

6.2. AREA PLAN (OFFICIAL PLAN) – Capacity plan covering a designated geographical area fed by one or more substations. This plan records recent and forecast substation and feeder load and capacity data, circuit connectivity and other pertinent information. It is also used to evaluate substations and feeders against historical data to prevent future overloads. The plan contains recommended projects and expenditure estimates for system reinforcements to achieve system operations consistent with the ComEd Distribution Capacity Planning Guidelines (AM-CE-Y013-R0002).

6.3. AREA PLANNING CONCEPT – A Planning Area consists of a group of adjacent substations, the circuits supplied by those substations and adjacent medium voltage substations. As part of each capacity planning cycle, an integrated substation and circuit capacity reinforcement project plan for each planning area will be developed. See ComEd Distribution Capacity Planning Guidelines (AM-CE-Y013-R0002).

6.4. AREA PLANNING TOOL (APT) – Electronic database and analysis tool used for the Area Plan.

6.5. AREA PROJECT CHALLENGE – The Area Plan and associated Project Diagrams are reviewed for technical and economic justification to ensure that the most appropriate capacity solution has been chosen. The Capacity Manager, Regional Capacity Managers, Capacity managers staff, Planners and other stakeholders participate in this review.

6.6. CAPACITY EXPANSION CATEGORY – The Work Category that owns all work associated with electric system expansion processes to support the design criteria (i.e. ComEd Distribution Capacity Planning Guidelines, AM-CE-Y013-R0002).

6.7. CIRCUITS – Circuits include lines and feeders for the purpose of this procedure.

6.8. COMPONENT– A piece of equipment or a combination of pieces of equipment (circuit, line, feeder, line group, transformer or substation) that the Capacity Planner compares the projected loading to the Allowable Loading to ensure compliance with the Distribution Capacity Planning Guidelines (AM-CE-Y013-R0002).

6.9. CONNECTIVITY – The relationships the APT program uses to roll up feeder load growth, new business, and transfers to substation transformer and terminal load forecasts. This is done thru a GUI (Graphical User Interface), which allows Planners to connect components to match electrical drawings of the transmission lines, transformers and feeders.

6.10. CUSTOMER – For the purpose of this procedure, a customer is anyone applying for service, including contractors, builders, and developers. This also includes existing end users of the electric distribution system.

6.11. DISTRIBUTION SYSTEM – The Area Plan covers the following system elements:

6.11.1 Radial 69 or 138 kV lines that supply High Voltage (HV) distribution substations.

6.11.2 HV distribution substations supplied by 69 and 138 kV lines.

6.11.3 Medium Voltage (MV) distribution substations supplied by 15 and 35 kV class circuits.

6.11.4 Distribution circuits (5, 15 and 35 kV levels). The terms circuit, feeder and distribution line all have the same meaning for the purpose of this document.

6.12. FORECAST REPORTS – The reports in APT shows the components by area that are projected to be overloaded and need relief for the forecast year. OBIEE Reports provide multi-year area and substation load and capacity forecasts with and without projects. The APT users manual provides examples of available reports.

6.13. HIGH VOLTAGE CUSTOMER/PRIMARY METERED CUSTOMER – Customer receiving power directly from the Company's distribution or transmission system with a delivery voltage of 2,400 Volts or higher.

6.14. INSITE – An enhanced load growth forecasting tool that takes data from APT, normalizes feeder level load growth with system forecast load growth and provides an improved algorithm for developing coordinated forecasts between areas, and improved accuracy for individual area, substation and feeder forecasts. INSITE determines all unidentified growth based on historical load growth trends and identified new business data.

6.15. ISSUE – A problem that is not being addressed acceptably under existing plans, that if not addressed could result in degraded system reliability or failure; or an improvement item that if not acted upon could result in degraded system reliability.

6.16. LOAD FORECASTING – Review and estimate of future load growth in planning area. See AM-CE-3032, Short-Range Load Forecasting Procedure.

6.17. LOAD FORECAST CHALLENGE – Review of INSITE feeder and substation load forecasts together with alternate forecasts (if any) proposed by Planners based on their detailed knowledge of area load expectations. Planning Managers use the INSITE results and Planners' alternate forecasts to determine the load forecast that will be used for developing the Official Plan. The results are then used to develop the Area Plans and associated projects. The load forecasts could change if there is new documented evidence of a significant change.

6.18. LOCKDOWN – Milestone date when the APT database is closed to any changes in the Official Plan and the Validation Plan.

6.19. OFFICIAL PLAN –The OFFICIAL PLAN focuses on feeder capacity projects in the second year and substation projects in the second through fifth years following the most recent peak load.

6.20. PROJECT DIAGRAM (PD) – High level description of changes to be made in order to provide the necessary capacity to customer(s) and load growth areas, or to increase reliability and operation flexibility of the system. A Project Diagram communicates the scope of the changes for the specified issue(s) via an electrical one-line and/or corresponding descriptive notes.

6.21. REFERENCE DOCUMENTS – All documents affecting the design of the project. These include operating maps, area maps, etc.

6.22. ROY (Red, Orange, Yellow) – A Capacity Relief Category that is applied on Project Diagrams to indicate the level of concern for the loading of a feeder or substation transformer.

Capacity Relief Category	Level of Concern	Thermal	
		Substation Load (1)	Feeder Load (3)
Red	Significant (Major)	110% +	120% +
Orange	Moderate	106 –109%	111 –119%
Yellow	Mild (Low)	101 –105%	106 – 110% (Bright)
Pale Yellow	Concern	N/A	101 – 105% (Pale)
Blue	Future concern	90 – 100%	90 – 100%
Green	No concern	< 90%	< 90%

Color	Voltage	Capacitor Program (% off Nominal Voltage:125V)
	All Feeder Voltages	
Red	Outside Regulatory Requirements	110% +
Orange	N/A	106 –109%
Yellow	N/A	101 –105%
Pale Yellow	N/A	N/A
Blue	N/A	N/A
Green	N/A	N/A

1. The substation-loading category applies to HV substations (69 - 138kV sources) planned for N-1 contingency ratings and all MV substations (12 - 34kV sources). If the HV substation is planned for the normal rating, increase by one relief category (e.g. Yellow to Orange, or Orange to Red).
2. If another project is contingent on the proposed project and has a higher relief category, increase the relief category to match the contingent project.
3. If there is a High Phase Relief PD on a three-phase device (transformer or cable), subtract 5% from projected overload percentage to determine ROY category definition to account for common cooling of phases.

6.23. ROY MAP – A map representing the loading as a percent of the allowable loading on all of the feeders in an area.

6.24. VALIDATION PLAN – A review of loads and proposed system reinforcement which were entered in APT on a given feeder or substation to assure they are appropriate; directly following the summer peak load season. This activity is to confirm that plans have been developed to address all capacity issues for the following year. The results of the INSITE forecast from the previous Official Plan are used as the basis for the Validation Plan load forecasts.

6.25. WEATHER ADJUSTMENT (WA) – The modification of peak loads to reflect a feeder's sensitivity to weather conditions in order to provide a common basis for planning capacity over time. Load is adjusted for 1 in 10 year design weather conditions. See AM-ED-3007 for the Distribution Capacity Planning Weather Adjustment Process.

7. References

7.1. LE-AC-401 – Exelon Corporate Procedure Records and Information Management, Retention and Disposition

7.2. AM-CE-3032, Short-Range Load Forecasting Procedure

7.3. AM-CE-9130, Identification of Substations, Circuits, and Electrical Equipment

7.4. AM-CE-Y013-R0002, ComEd Distribution Capacity Planning Guidelines

7.5. AM-EU-3005, Project Identification and Tracking Procedure for Capacity Planning

7.6. AM-EU-09145, Distribution Capacity Planning Weather Adjustment Process

7.7. AM-EU-09125, Project Planning Lead Time

7.8. AM-EU-09129, Project Approval Process for Capacity Planning

7.9. AM-EU-09131, Load Transfer Estimate Procedure

7.10. AM-EU-09139, Project Issuance Procedure for Capacity Planning

7.11. AM-EU-P150, Distribution Capacity Planning and Expansion Program (Parent Document)

7.12. APT User Manual

7.13. AM-ED-P002, Project Approval Process for Capacity Planning

8. Attachments

8.1. AM-CE-P127-1, Choosing Peak Loads in APT

8.2. AM-CE-P127-2, Area Planning Process Flowchart

8.3. AM-CE-P127-3, Exception to Planning Criteria Approval Form

9. Development history

Revision 0	**Date: 11/17/2008**
Writer	Michael Born, Principal Engineer, Capacity Planning; John Spare, consultant, Quanta Technologies
Reviewer(s)	Frank Luedtke, Capacity Planning; Dan Schick, Capacity Planning; Thai Tu, Capacity Planning; Matt Liethen, Capacity Planning
UFAM Approver(s)	M. Michelle Blaise, Reliability Programs, Director
Reason written	Incorporate load forecasting and project challenge process improvements that were developed during fall 2007 for ComEd. Adapted from AM-ED-P001 for ComEd.

Revision 1	**Date: 12/2/2013**
Writer	Georgiy Bolotin (Capacity Planning)
Reviewer(s)	Mike Born, Frank Luedtke, Russell De Salvo, Lap Dao, Laura Lee Whittington, Jerry Meier, Christopher Pytel (Capacity Planning)
UFAM Approver(s)	William Gannon (Engineering Director)
Reason written	Total revision based on cyclic review

Revision 2	**Date: 11/25/2014**
Writer	Georgiy Bolotin, Francisco Rivera, Chong Huh (Capacity Planning)
Reviewer(s)	Mike Born, Frank Luedtke, Russell De Salvo, Lap Dao, Laura Lee Whittington, Jerry Meier, (Capacity Planning)
UFAM Approver(s)	Mike Born, (Capacity Planning)
Reason written	Revision based on cyclic review and ComEd function

Revision 3	**Date: 11/25/2017**
Writer	Joanna Dlugopolski, Godwin Itteera, Scott DiBasilio (Capacity Planning)
Reviewer(s)	Laura Lee Whittington (Capacity Planning)
UFAM Approver(s)	Pete Tyschenko, UFAM Capacity Expansion - Distribution
Reason written	Periodic review.

Revision 4	**Date: 11/23/2020**
Writer(s)	Christina Florek, Anna-Sofia Jackson, Teshome Maru, Pramel Patel, Steve Peisker (Capacity Planning)
Reviewer(s)	Brooks Glisson, Natalie Hammer, Kevin Happ, Jim Stamatopoulos, Kris Sudol (Capacity Planning)
UFAM Approver(s)	Marina Mondello, UFAM Capacity Expansion - Distribution
Reason written	Periodic review.

AREA PLANNING PROCESS

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Revision No.: 4

CHOOSING PEAK LOADS IN APT

The objective of this procedure is to define the method of choosing the peak load for each component in APT (Area Planning Tool). This typically takes place after the system peak has occurred for a given summer season. For each component equipped with SCADA, APT defaults to the load reading that occurred on a pre-selected "high load" day. For each non- SCADA component, APT defaults to the manually entered load reading from the same pre-selected "high load" day.
The Area Planner is expected to check these default values for validity, especially for components that are forecasted to approach or exceed their rating. This will ensure that all overloaded components are addressed and will prevent spending money on unnecessary relief work. Every component is required to be analyzed.

For each component determine the following:

- Was the component in its "normal" configuration on some or all of the "high load" days?
  a. Switching: manual ties/ breakdowns, substation bus-ties, reclosers schemes, feeder caps out of service, ATO's, cold load pick-up after circuit tripping (max drag hand error)
  b. Temporary utility owned generation deployed
  c. Load curtailments in effect (curtailable rates, load shed (manual), etc.)
  d. System voltage reduction in effect
- Was associated reinforcement work accomplished as planned?
  e. All PD's completed before the "high load" days
  f. All PD's completed as planned
  g. Load transfers accurate
- Were pertinent customers operating as expected?
  a. Customer owned generation on/off as expected
  b. Customer owned transfer switches in expected state (especially municipalities)
  c. Changes in large customers' load patterns: summer vacation, peak shift, out of business
  d. Identified New Business realized (see example #2 on page 3 of 3 of this attachment for handling unrealized New Business)
  e. Significant New Business added without knowledge of Capacity Planning

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CHOOSING PEAK LOADS IN APT continued

- General considerations
  a. All WA peak loads close to the same value

  b. Weather adjustment seems reasonable

  c. SCADA working properly (compare amps & MVA if available)

  d. Forecast from previous year seems reasonable

In general, it is desirable to select loads for the same high load day for all the components in a given area. The Area Planner should determine which of the high load days best represents the Area's peak loading for a given season. The weather-adjusted loads for this day should be used for most of the components in that Area. There may be some isolated components for which a Planner may want to choose a different high load day or even the previous year's weather adjusted peak load at his or her discretion. Some examples are: a component whose metering was defective on the pre-selected high load day, switching that occurred on that day, or an extended outage that occurred on that day. In cases such as these, it is important that the Planner clearly document the reason for choosing the load.
When compensating for abnormalities in configuration or loading, the Area Planner should select the load as it actually occurred on that high load day and then enter an offset either as a transfer or as New Business. See the following examples for further clarification:

1) Feeders A and B were each projected to have peak loads of 330A. On the high load day that the Area Planner has determined best represents the Area's peak loading, Feeder A had a weather adjusted peak load of 400A and Feeder B had a weather adjusted peak load of 260A. The Area Planner has determined that 70A was switched abnormally from Feeder B to Feeder A during the peak. The weather adjusted peaks of 400A and 260A should be chosen for Feeder A and Feeder B respectively. A 70A transfer with a service date prior to next year's peak should be added in APT (assuming the configuration is expected to return to normal by the following year's peak) to account for the abnormal switching. The transfer should include a description of the abnormal condition including switching routine number, disconnect numbers, etc. By entering this transfer, all the upstream components will be automatically corrected as well as the feeders involved. It is important to choose the same high load day for *all* components involved in the out of configuration situation.

CHOOSING PEAK LOADS IN APT continued

2) Feeder C was projected to have a peak load of 330A including 60A of Identified New Business. On the high load day that the Area Planner has determined best represents the Area's peak loading, Feeder C had a weather adjusted load of 300A The Area Planner has determined that the New Business load was connected to the system by the time the peak occurred; but only 30A of the expected 60A had been realized. The weather-adjusted load of 300A should be selected for Feeder C and a New Business entry for the remaining 30A should be entered on Feeder C (assuming the remaining 30A of New Business load is expected to be added by the following year's peak).

3) Feeder D was projected to have a peak load of 330A. This feeder serves a cogeneration customer who has been proven "dependable or dispatchable" according to established Capacity Planning guidelines and typically generates 30A onto Feeder D. On the high load day that the Area Planner has determined best represents the Area's peak loading, Feeder D had a weather-adjusted load of 360A. The Area Planner has determined that the cogeneration was not running during the peak. The weather-adjusted load of 360A should be selected for Feeder D and a new New Business entry for -30A should be entered on Feeder D (assuming the cogeneration is expected to be running by the following year's peak). Planning guidelines require that the system be robust enough to continue serving the connected load within equipment ratings in the event of the loss of the largest cogeneration unit. In the future, APT will have a field to account for these events. Presently, this should be accounted for in the allowable rating and documented in the "Notes" field of affected components.

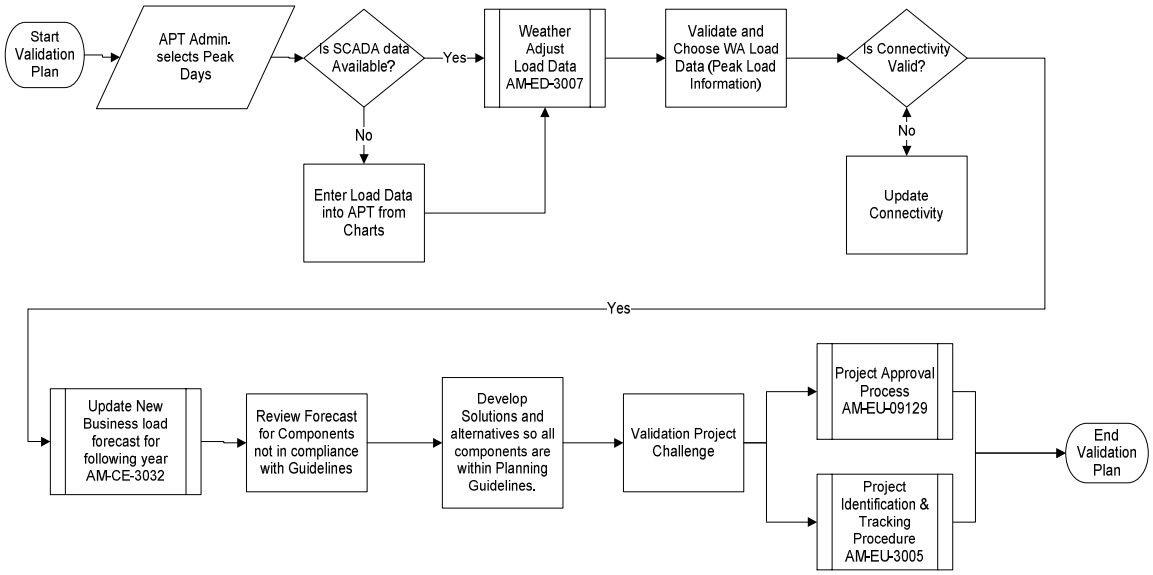
4) Feeder E was projected to have a peak of 330A. Feeder E had a weather-adjusted load of 300A. The Area Planner has determined that the load served by this feeder is largely manufacturing and therefore highly susceptible to changes in economic conditions. Since for this particular year, the economy has been sluggish, the Area Planner had decided to use an "economic recovery adjustment" to return this feeder's projected load for next year to a more historically typical level. The weather-adjusted load of 300A should be selected for Feeder E and a New Business entry for 30A should be entered on Feeder E with a description that identifies it as an "economic recovery adjustment."

AREA PLANNING PROCESS

ComEd Process
AM-CE-P127
Revision No.: 4

AREA PLANNING PROCESS FLOWCHART

Validation Plan



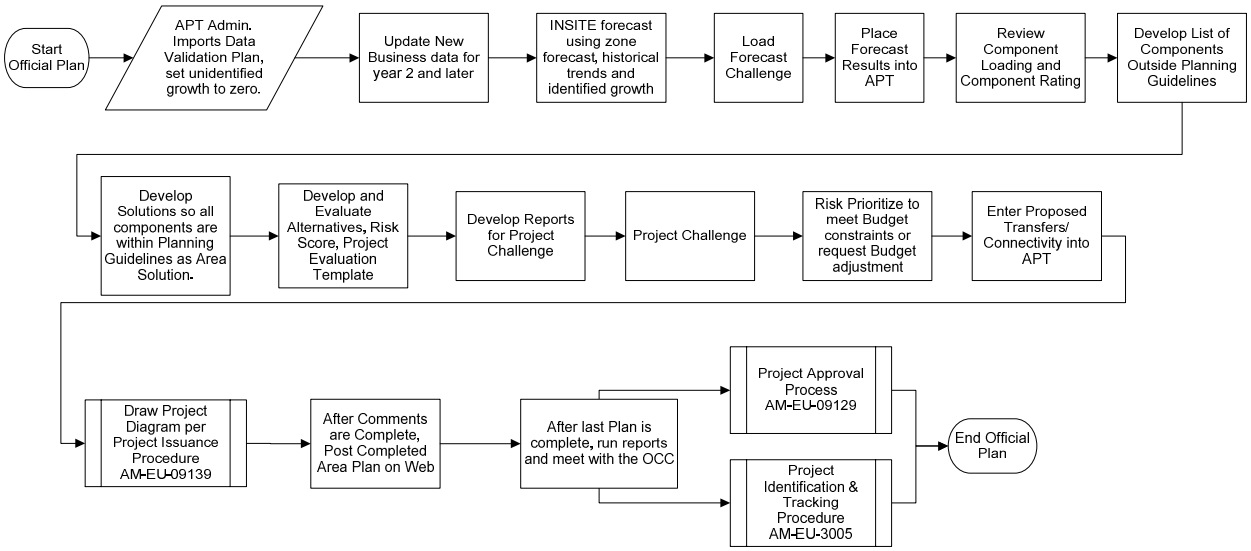
Attachment AM-CE-P127-2
Page 1 of 2

AREA PLANNING PROCESS

ComEd Process
AM-CE-P127
Revision No.: 4

AREA PLANNING PROCESS FLOWCHART continued

Official Plan



Attachment AM-CE-P127-2
Page 2 of 2

Exception to Planning Criteria Approval Form

Planner: _____ Area _____

Component: _____ Component Type _____

Component	Projected Load	Allowable Rating	Percent Allowable	Normal Rating	Percent Normal	Emergency Rating	Percent Emergency
0			#DIV/0!		#DIV/0!		#DIV/0!

Year for Exception: _____ System Engineer (OCC) Notified? _____

Long Range Plan for Component

Contingency Plan Required: _____

If Yes, Is Contingency Plan Attached? _____ Has OCC Approved Plan? _____
(Required)

If No, Provide justification why a contingency plan is not required.

Required Approval: _____ _____
Engineering Director Date

Required Approval: _____ _____
Regional Capacity Planning Manager Date

Note: A separate form is required for each component for each year

Note: Upon approval, the signed document will be scanned and posted on the web site along with the contingency plan in the Area Plan folder.

Attachment AM-CE-P127-3